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ABSTRACT

The existence of a gap in academic achievement between males and females was studied using data from the National Longitudinal Study (NLS), the High School & Beyond (HSB), and the National Education Longitudinal Study (NELS), surveys that represent the high school graduating classes of 1972, 1980, and 1992 respectively. The effects of gender on school-related outcomes were studied for students who attended a full 3 or 4 years of high school. The entire analyses treated the gender gap as the dependent variable. There is no evidence for a one-way gender gap favoring males beyond 1992 in public secondary schools. As of 1992, females possess a significant advantage on most central educational outcome indicators. These results suggest that broad nationwide efforts to bring about gender equity in schools has been effective. Boys, rather than girls, are now on the short end of the gender gap in many secondary school outcomes. (Contains 43 references.) (SLD)

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Gender Gap Trends in Public Secondary Schools: 1972 to 1992

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Gender Gap Trends in Public Secondary Schools:1972 to 1992

Recent reports have confirmed that boys, not girls, are increasingly on the unfavorable side of the gender gap in education and developmental matters. For example, enrollments in institutions of higher education in the 1990s favor females by a ratio of 54 to 46 (Green et al., 1993). As recent as 1980, the ratio was 50/50. Of course, in 1970 the ratio favored males by a margin of 59 to 41. Similarly, in 1971 only 43 percent of those people who received a baccalaureate degree and 40 percent of those who received a master's degree were women, compared to 54 percent for each degree in 1993 (Kopka and Korb, 1996). Because of this large gap favoring males just 25 years ago, it is easy to understand how the reversal has gone un-noticed. Among African and Hispanic-Americans, the gap actually favored females in 1970 and has expanded substantially during these past two decades (Kopka and Kolb, 1996). This pattern is repeated throughout Europe (The Economist, 1996). The issue has recently become a matter of concern to college officials interested in maintaining a balanced male/female ratio (Gose, 1997).

The U.S. Department of Education's Condition of Education 1995 (Smith et al., 1995) concluded that "the gap in reading proficiency (favoring girls) is roughly equivalent to about one and a half years of schooling." (p.13). In the July 7, 1995 issue of Science, Larry Hedges and Amy Nowell show that boys writing skills are significantly and profoundly below the skill levels of girls. Jones et al, (1992) confirm that girls usually outperform boys in reading and writing, as early as the fourth grade. It is true that all of the above sources show differences favoring boys in mathematics and science, but the differences are smaller and these deficits for girls in science and mathematics have been provided with special treatments over the past twenty years or so (Bank and Hall, 1997; AAUW, 1992) . And, in fact, some of the data does show that the achievement

test score differences in mathematics have been reduced considerably as a result (Lee et al., 1996; Linn and Hyde, 1989).

Educational Testing Service (ETS) has just released a four year study reinforcing this emergent view regarding the gender gap. In this report, Willingham and Cole (1997) analyzed data from 400 different tests from more than 1500 different data sets. They found that for most subject matter tests, gender differences were very small and whenever a gender difference was found it "cut both ways." The researchers acknowledged that the results contradict the view that girls need to catch up with boys. In particular, they note that "12th grade girls have substantially closed the familiar math and science gap over the past 30 years but there continues to be a fairly large gap in writing skills that boys have not closed" (ETS, 1997, p.10). Nowell (1997) found exactly the same results using pretty much the same data.

But there are other indicators that deserve attention as well. Girls have consistently obtained better grades and higher class ranks than boys (Alexander et al, 1982). In NELS 1988, Hafner et al., 1990 found that 8th grade girls were significantly more likely (by 6 percent) than boys to be in the highest quartile of self reported grades, and significantly less likely (by 7 percent) to have repeated at least one grade. More boys than girls suffer from learning disabilities. Approximately three times as many boys as girls are enrolled in special education classes (Smith et al, 1995). More boys than girls are involved in all types of crime, delinquent and violent behavior, as the use of alcohol and drugs, both in and out of school (Hafner et al. 1990; Duke, 1976). Rich et al. (1992) found that although girls experience higher rates of depression and suicide ideation, boys experience more loneliness and substance abuse. Moreover, Rich et al. discovered that boys were less likely than girls to seek professional help when they did feel suicidal. Numerous studies

have found that alcohol and tobacco abuse is significantly greater among boys than among girls (Clayton et al, 1986; Beck and Summons, 1987; Reinherz, 1993). Finally, Hetherington (1993) and Cherlin (1992) have reported that boys face greater problems than girls adjusting to the divorce of their parents.

A recent report on the behavior patterns of college freshman determined that men spend most of their time exercising, partying, watching TV or playing video games--almost twice as much time as women on these activities. By contrast, college women, spend more time than college men talking to teachers, in student groups, reading for pleasure, studying and doing homework, and in volunteer work (Astin, 1995).

Despite this array of male deficits, virtually all efforts continue to be targeted towards the problems of girls. For example, the American Association of University Women has committed funds for studies that have received national and international headlines. These studies have resulted in several publications: How Schools Shortchange Girls (AAUW, 1992) and Hostile Hallways (AAUW, 1993), and School Girls:Young Women, Self-esteem, and the Confidence Gap (Orenstein, 1994). These reports have captured widespread attention, and I have often cited these studies in my own work because they contribute like any study to the overall picture of what is going on. But what is curiously missing here are studies that address educational and developmental outcomes in which boys are now (and in some cases always have been) at a disadvantage. With the October 1998 release of Gender Gaps, (AAUW, 1998), they now sound the alarm to the crisis of computer technology as the next battle zone where schools are still shortchanging girls. In actuality, the gap is 5% (25% of girls compared to 30 % of boys take computer classes). Moreover, they cast a negative aspersion on the fact that more girls than boys

enroll in word processing and data manipulation courses, despite the fact that these courses are extremely useful for professions such as law, medicine, investment banking, and finance.

It is interesting to note that the AAUW commissioned another study (Lee et al, 1996) that was completed recently and which found the very kind of inconsistent results regarding the gender gap that I have described above. Since the results were not supportive of the view that schools only shortchange girls, it was given virtually no media attention by the AAUW who commissioned it. In fact, Lee et al (1996:32) discovered that "some gender differences favor girls (engagement and reading) and some favor boys (science and social studies)". There were no observed gender differences in mathematics (see also Lee, 1997, p.139)".

All of this raises the possibility that boys may be increasingly disadvantaged in school especially in certain vulnerable sectors of school and/or among certain vulnerable sectors of the social structure. Specifically, boys might perform and develop less well in public schools rather than private schools, in general/vocational track rather than college tracks, in urban rather than suburban schools, and with low SES and/or minority groups. In this paper, I look only at the results for students in public schools.

Research Design, Data, and Methodology

Data from The National Longitudinal Study (NLS), High School & Beyond (HSB), and The National Longitudinal Educational Survey (NELS) provide an excellent basis for assessing changes in gender effects over the past twenty years. They represent the high school graduating class of 1972, 1980, and 1992, respectively.

For each data set, I employed one of more flags or variables to remove transfers and dropouts from the analysis. Insofar as is possible, we wish to know the effects of gender on school related outcomes for students who attend for a full three or four years of high school. This restriction provides a more stable portrait of both the demographics and student outcomes. Of course, this restriction does not allow us to estimate the patterns of transfers and dropouts and how these might change the demographic patterns and the outcomes. In this research, however, we are searching for the general pattern of gender effects for most students. The analyses of dropouts is not possible in this project since dropouts are not even available for NLS 1972, despite the importance of the issue.

The entire analyses treats the gender gap (female/male difference on outcomes) as the dependent variable. As is the case in all studies of school effects, "selection bias" is a possible source of invalidity. It is not inconceivable that girls who graduate from high school were selectively better students, relative to boys. Throughout the analyses, therefore, a set of home background variables are used as controls for "selection bias". These controls are limited to those variables that are available in exactly the same measured form in each of the data sets – socioeconomic status, family structure, religion, region, and race.

I estimated the female/male gap for each outcome variable, controlling for home background within the public school sector. These results appear in Table 1 as the estimated gender gap in each sector, assuming no difference in these background characteristics. This allows us to compare a predicted score for males and females in each sector under the statistical assumption that the students came to school with similar background characteristics (bearing in mind throughout that the background controls are limited as noted above). The multivariate

analyses estimates "effect sizes" in the gender gap. Effect sizes are differences between two means divided by the pooled standard deviation of these means (the controlled effect size applies background controls as noted above via a regression equation). This standardizes the effect across the years and allows for comparisons that are not possible using the actual mean scores. Effect sizes are also referred to as the standard mean difference (D).

Results

Variables in the three NCES surveys have included a greater variety and number of questions over the course of time from 1972 to 1992. In the National Study of the High School class of 1972 (NLS) there are only a limited number of outcome measures that can be compared to the same measures in 1992 or 1980. By 1980, however, a wider range of variables were included and continued in 1992. Thus, in 1972, only seven outcome variables are available that were continued in 1980 and 1992. For the 1980 and 1992 surveys, an additional set of items are added to the analysis as shown in Table 1. A total of 15 dependent outcomes are shown in the table which cover a wide variety of outcomes.

Table 1 is divided into three blocks of results for students in public secondary schools. The upper block shows trend changes that are increasingly positive for girls. The second block shows trend changes that are increasingly negative for girls, and the third block shows results which are relatively stable and positive for girls. The results show the gender gap controlling for the background characteristics of students within the public school sector. A positive score favors female and a negative score favors males.

In 1972, the educational expectations of girls were very low compared to boys, and this is reflected in the percent of males and females who are located in a college track. In public secondary schools in 1972, boys were more likely than girls to be in a college track and more likely to hold higher educational expectations. Also in 1972, boys scored higher than girls in mathematics (and probably in science although this is not included here). These three factors by themselves were probably sufficient to fuel the widely held view that girls were on the unfavorable side of the gender gap at that time. On all other measures in 1972, girls outperformed boys-they had higher occupational expectations, did more homework, did less part-time work, and scored higher in reading. Taken as a whole in 1972, girls average .08 ES higher than boys in public schools. Hence, based on this set of measures, there is no strong basis to think that a one way gender gap favoring males actually existed in public secondary schools as early as 1972. Females were clearly disadvantaged, however, on three key school outcomes. Excluding homework and part time work, the effect size is -.05 favoring males.

By 1980, the overall average gender effect has increased slightly favoring females. There are several key transformations, however, which appear to set the stage for what will happen during 1980 to 1992. Note that in 1980 the gender gap has reversed itself for college track placement and educational expectations, and that there is a decrease in the gap favoring males in mathematics. In the 1980 survey, we are able to see that the gap favoring females generally holds across an additional set of variables such as time spent reading for pleasure and the likelihood of not being in a remedial math or English class. We do see, however, that girls expect to finish their formal schooling at an earlier age than boys in 1980 (surely true also in 1972). And we can also observe in 1980 a wider set of outcomes that are unfavorable for boys including placement in

remedial math and English classes, less time reading for pleasure, added to those found previously in 1972 (less homework, more part-time work). Although barely significant, as early as 1980, Table 1 shows that girls are more likely to be enrolled in a science and math class during the 10th to 12th grade.

In 1992, we note that the trend towards an advantage for girls in educational and occupational expectations, in reading, and in college track placement has continued. Mathematics scores are now at parity. In addition, by 1992 girls expect to finish their formal schooling at a later age than boys (a complete reversal from 1980) and cut class significantly less than boys.. On the other hand, several negative trends observed in 1980 have increased for females. In 1992, girls do only slightly more homework, work only slightly less, and read for pleasure only slightly more than boys. Specifically, in public schools, an academic advantage for girls of time on homework (.42) in 1972 has been greatly reduced (.17) in 1992, and the female advantage of time not working part-time has eroded ever further from .37 to .11. These findings seem reasonable in view of increased participation of girls in sports and other recreational activities over this time period, but they are substantial losses from female advantages held in 1972 and 1980.

Finally, Table 1 shows in the lower block that there are additional outcomes in 1992 which parallel the results in 1980, and which are generally more favorable to girls than boys. These include enrollments in remedial courses, and enrollments in regular science and math classes. Many of these advantages for girls are small, but they are consistent across the years. Taken as a whole, the results support the view that by 1992, and possibly as early as 1980, the gender gap no longer favored boys in public secondary schools. Missing from these analyses, of course, are measures on sexual harassment in schools which would clearly disadvantage females. Also,

despite great gains in extracurricular participation, boys continue to dominate in many areas of great importance and value (in our culture) especially varsity athletics.

Conclusions

There is no evidence for a one way gender gap favoring males beyond 1992 in public secondary schools. In an earlier paper, I drew the same conclusion for Catholic secondary schools, and in further analysis have found the same results among low and high SES students, high and low track students, and among both Black and white students (see, Riordan, 1998). As of that time, females possess a significant advantage on most central educational outcome indicators, on average. Movement towards this 1992 state of affairs can be observed in the trend results as early as 1980. At the same time, females have lost a significant gender gap advantage that they previously held on several variables that are indirectly related to educational outcomes. These gaps favoring females would surely be larger if dropouts had been included in the analyses (or if the measures were made at the 10^{th} rather than 12^{th} grade) since males are now 4 percent more likely than females to dropout.

All of this suggests that the broad nation wide efforts to bring about gender equity in schools has been effective. Hypothetically, one might have expected that these efforts to raise female achievement might have been limited to students of higher socioeconomic status and/or to students in private schools. As is often the case, one might have feared that low SES females in public schools would have been left out of the movement towards gender equity. The fact that this is not the case points to the depth and breadth of the nationwide effort to address the needs of

girls and women in schools.

As a result of these trends, boys rather than girls are now on the short end of the gender gap in many secondary school outcomes. In 1992, boys are less likely than girls to be in an academic (college) curriculum; they have lower educational and occupational expectations, lower reading test scores, and they expect to complete their schooling an earlier age. They are more likely to cut class and more likely to be placed in remedial math and English classes. Boys do less homework, work more at part-time jobs, and read less for pleasure outside of school. They are less likely to be enrolled in a science and mathematics class sometime during the 10th to 12th grades, and they have a lower sense of environmental locus of control. They feel no more safe at schools than girls and their mathematics test score are no greater than girls.

In addition to the outcome measures considered in this paper, boys are more likely to drop out of school, obtain lower grades and lower class ranks than girls, and they are more likely to suffer from learning disabilities. Men are less likely to attend college and while in college they spend more time than women exercising, partying, watching TV or playing video games. Consequently, they are less likely to graduate from college than women. As a whole, boys are not doing well in school, and this is probably an understatement if we were to consider high risk youth. In addition to findings in this paper, and the citations in the introduction, two recently released studies provide further confirmation for the above conclusions (see, Harris, 1997; Kleinfeld, 1998).

There are, of course, other factors that do require consideration in estimating the direction of the gender gap. One of these factors is the degree of sexual harassment that occurs both in and out of school. Unfortunately, the NCES data sets do not provide data on this except during the

NELS 1992 survey. There is, however, one question concerning the degree to which the student "doesn't feel safe at school" and surprisingly, there is no male/female difference on this variable in 1992 whereas girls did report being less safe in 1980 in the public schools. Females in Catholic schools (both single and coeducational report the greatest degree of safety relative to their male counterparts (Riordan, 1998).

Out of school, however, might be an entirely different matter. In fact, in a nationwide survey in 1993 girls reported that they had been sexually harassed to a greater degree than boys along a wide range of specific harassment behavior (AAUW, 1993). On average, 83 percent of the girls and 60 percent of the boys had received unwanted sexual advances either in school or the school ground or coming to and from school (Lee et al. 1996). There were several items, however, in which boys were more likely to have been harassed. Moreover, a 1995 NCES report found substantial bullying, physical attacks, and robbery in schools, and that "boys were more likely to be victimized at school than were girls (14 versus 9 percent , respectively)" (Nolin et al., 1995). Thus, the matter of safety and harassment in schools is not unidirectional.

Another issue is that educational outcomes do not transfer immediately into changes beyond the classroom. Ultimately, educational advantages for females, should they persist, will lead to greater equity in occupational attainment and income. But this is not yet a reality. Women continue to be undervalued in the work place, excluded from leadership posts in many occupations, and underpaid relative to equally qualified men. This issue can be conceived as the distinction between getting "into" the proverbial pipeline and getting "through" the pipeline (Neumann, 1998). Finally, as demonstrated in this paper, girls are now doing less homework, working more part time after school, and reading less for pleasure outside of school.

There are several ways of interpreting the implications of these findings. In the not too distant past females were on the bottom end of the gender gap on virtually all education outcome indicators. Based on the 1972 results alone, one can easily imagine that in 1962 and backwards, the effect size gender gap favoring males would have been quite large. For example, although women in 1997 are more likely than men to have completed four years of college or more (29 versus 26 percent), men still hold a lead in college completion for the total 1997 population age 25 and older by 26 to 22 percent (U. S. Census Bureau, 1998). Thus, one could easily conclude that the movement towards gender equity is not yet complete. Conceivably, gender equity might require more than an equal opportunity structure and more than equal outcomes, given the long history of gender stratification in schools and in society.

On the other hand, as we prepare to move into the 21st Century, we also must recognize that boys are not flourishing in school relative to girls. This being the case, the educational needs of boys requires close monitoring over the next decade, perhaps leading to a more balanced approach to the study of gender equity in schools.

Table 1			
Female/Male Differences on Selected Variables in Public Schools (Effect Sizes)			
Outcome Variable	1972	1980	1992
Educational Expectations	-.20	.05	.14
Occupational Expectations	.17	.24	.41
Mathematics Test	-.23	-.17	-.04
Reading Test	.08	.05	.28
College Track Placement	-.06	.04	.09
Age Expect to Complete Education		-.04	.14
Times Cut Class (less is positive)		.06	.16
Hours/Week Homework	.42	.32	.17
Hours/Week Working (less is positive)	.37	.33	.11
Time Read for Pleasure		.33	.11
Never in Remedial English		.14	.16
Never in Remedial Math		.11	.09
Enrolled in Science Class 10th-12th		.05	.09
Enrolled in Math Class 10th-12th		.05	.10
Don't Feel Safe at School		-.04	.01
Overall average	.08	.10	.13
Number of Respondents	11,903	21,040	11,863

Note: + favors females; - favors males; effects above .05 are significant at .05; All effect sizes estimated using the weighted sample; significance levels obtained by including an adjusted weight which takes into account the design effect. For items that were dichotomous, a logit regression was used to confirm the results of the OLS analysis.

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